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## (54) MICRO PILOT VALVE

(71) Applicant: **Burkhard Büstgens**, Gundelfingen

(DE)

(72) Inventor: **Burkhard Büstgens**, Gundelfingen

(DE)

(73) Assignee: Burkhard Büsrgens, Gundelfingen

(DE)

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(56) References Cited

U.S. PATENT DOCUMENTS

3,152,612 A \* 10/1964 Avery ...... F16K 31/006 137/625.4

3,236,452 A \* 2/1966 Bordeaux ...... F01N 3/2053 137/110

(Continued)

FOREIGN PATENT DOCUMENTS

DE 19946833 A1 5/2001 DE 102007028673 B3 8/2003

OTHER PUBLICATIONS

International Search Report of PCT/DE2013/000166.

Primary Examiner — William McCalister

(57) ABSTRACT

The invention relates to a micro pilot valve 1, which is characterized by a micro cavity 2, which is connected with valve outlet 3, a first micro opening 4 between micro cavity 2 and a first pressure level 5, a second micro opening 6 between micro cavity 2 and a second pressure level 7, a sealing element 8 within micro cavity 2, which is movable between the micro openings, and which in a first end position closes micro opening 4 and in a second end position micro opening 6, whereas the control pressure in the first end position adopts the value of the second pressure level 7 and in the second end position the value of the first pressure level 5, and a micro actuator 10, which actuates sealing element 8 via a transfer element, which protrudes at least through one of the micro openings.

## 8 Claims, 3 Drawing Sheets

